

Claims

[c1] What is claimed is:

1.A method of fabricating a semiconductor device comprising:

providing a substrate;

sequentially forming a first organic layer, a sacrificial layer, and a second organic layer on the substrate;

performing a photolithography process for forming a predetermined pattern in the second organic layer;

utilizing the second organic layer as an etching mask for etching the sacrificial layer till a surface of the first organic layer is exposed, thus the predetermined pattern being transferred to the sacrificial layer;

utilizing the sacrificial layer as an etching mask for etching the first organic layer till a surface of the substrate is exposed, thereby the predetermined pattern being transferred to the first organic layer;

utilizing the sacrificial layer and the first organic layer as an etching mask for etching the substrate, thereby transferring the predetermined pattern to the substrate; and

removing the first organic layer by use of plasma.

- [c2] 2.The method of claim 1 wherein the first organic layer is made of a material selected from the group consisting of low dielectric organic materials and spin-on glass (SOG).

- [c3] 3.The method of claim 1 wherein the plasma is selected from the group consisting of oxygen (O_2), nitrogen (N_2), hydrogen (H_2), argon (Ar), C_xF_y , $C_xH_yF_z$, and helium (He) plasma.

- [c4] 4.The method of claim 1 wherein the sacrificial layer is made of a material selected from the group consisting of silicon nitride and silicon oxide.

- [c5] 5.The method of claim 1 wherein the second organic layer is made of an organic photoresist material capable of absorbing light with a wavelength of 248nm and the less.

- [c6] 6.The method of claim 1 wherein the second organic layer is suitable for an e-beam lithography process.

- [c7] 7.The method of claim 1 wherein the substrate is selected from the group consisting of a silicon substrate, a metal substrate, and a dielectric layer.